

REMARKS

In response to the Office Action dated March 19, 2002, Applicants respectfully request reconsideration and withdrawal of the rejections of the claims.

Claims 1 and 3-6 were rejected under 35 U.S.C. §102, on the grounds that they were considered to be anticipated by the newly-cited Kawase et al. patent. It is respectfully submitted, however, that the Kawase patent neither anticipates, nor otherwise suggests, the subject matter of the present invention.

As discussed in Applicants' prior responses, the present invention relates to a wire-bonding apparatus in which a workpiece and the bonding head are moved relative to one another by means of translation along orthogonal X and Y axes. In accordance with the invention, the bonding head transducer is oriented so that its longitudinal axis lies along a line dividing the X and Y axes. For example, in the embodiments of the invention illustrated in Figures 4, 5 and 6 of the present application, it can be seen that the transducer has a fixed orientation relative to the X and Y axes. In the preferred embodiment of the invention, this orientation is along a line which bisects the X and Y axes, i.e. at a angle of 45° relative to each axis. In the embodiment of Figure 6, the bonding head supporting means is adapted to move along the X and Y axes.

As a result of these arrangements, the longitudinal axis of the transducer remains oriented in substantially the same position throughout the entire cycle of an operation associated with wire bonding. This aspect of the invention is brought out in claim 1, which recited, among other features, "means for supporting the bonding head above the

workpiece such that the longitudinal axis of said transducer is fixed along a line dividing said X and Y axes to be oriented along said line at all times..."

The rejection based upon the Kawase patent states "The transducer axis would remain fixed (locked) during the actual bonding process..." However, the rejection does not address the above-quoted subject matter of claim 1, namely that the longitudinal axis of the transducer is fixed "along a line *dividing* said X and Y axes." Referring to Figure 1 of the Kawase patent, one of the X and Y axes is parallel to the plane of the paper, and the other axis is perpendicular to this plane (column 3, lines 29-34). As can be seen, the longitudinal axis of the bonding tool 16 is parallel to the plane of the paper. Consequently, the transducer axis is oriented along one of the X or Y axes, rather than along a line *dividing* these two axes, for example at an angle of 45° relative to each axis. In other words, the Kawase patent is representative of the prior art illustrated in Figures 1 and 2 of the present application.

It is respectfully submitted that the Kawase patent does not anticipate, nor otherwise suggest, the subject matter of claims 1 and 3-6, since it does not disclose a bonding head having a transducer whose longitudinal axis is fixed along a line dividing the X and Y translational axes that provide relative movement between the workpiece and the transducer. If the rejection is not withdrawn, the Examiner is respectfully requested to explain how the patent is being interpreted to anticipate this claimed feature of the invention.

Claims 1-4, 6-8 and 10 were rejected under 35 U.S.C. §102, on the grounds that they were considered to be anticipated by the newly-cited Yoshida et al. patent, and claims

1-11 were rejected under 35 U.S.C. §102, on the grounds that they were considered to be anticipated by the newly cited Amorosi et al. patent. It is respectfully submitted that these two patent are similar to the Kawase patent, in that they disclose transducers whose longitudinal axis is oriented along one of the X or Y axes that define the relative movement between the workpiece and the bonding head, rather than along a line dividing these two axes. For example, Figure 4 of the Amorosi patent explicitly illustrates that the longitudinal axis of the transducer 81 is oriented along the X axis. In the Yoshida patent, Figures 9(B), 11 and 12 illustrate that the X axis is defined by the shafts 68a and 68b, while the Y axis is defined by the shafts 79a and 79b (column 11, lines 25-30 and 48-52). Referring to Figure 5, it can be seen that these two sets of shafts are respectively oriented parallel to and perpendicular to the plane of the paper. In addition, it can be seen that the longitudinal axis of the transducer 15 is parallel to the plane of the paper. Hence, the longitudinal axis of the transducer is oriented *along* one of the X and Y axes, rather than a line dividing these two axes.

For the reasons set forth previously, therefore, it is respectfully submitted that neither of the Yoshida nor Amorosi patents anticipates the subject matter of the claims, since they disclose bonding heads whose transducers are oriented along one of the X and Y axes that provide relative movement between the head and the workpiece. If the rejection of any of the claims based on these references is not withdrawn, the Examiner is respectfully requested to explain how the references can be interpreted to anticipate the recitation in claim 1 which states that the longitudinal axis of the transducer is fixed along a line *dividing* the X and Y axes.

In addition to the foregoing grounds of rejection, the Office Action also repeated the rejections of the claims based upon the Quick et al., Elles et al. and Cheng et al. patents. As pointed out in Applicants' previous responses, each of these three references discloses an arrangement in which the transducer is rotated about a vertical, or Z, axis. Hence, in contrast to the present invention, the longitudinal axis of the transducer is not "fixed along a line dividing said X and Y axes to be oriented along said line at all times," as recited in claim 1. Due to the rotational nature of the transducer, it may be oriented at an angle relative to the X and Y axes in some instances, but at other times it is just as likely to be arranged parallel to the X axis, or the Y axis. It is not "fixed" along the line dividing these axes.

In responding to Applicants' arguments traversing the rejections based on these three references, the most recent Office Action states "a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art." (Page 6, paragraph 7). With regard to this point, it is to be noted that the recitation of the structural relationship of the longitudinal axis of the transducer to the X and Y translational axes is not a statement of "intended use." Rather, it is an explicit *structural* recitation. The claim recited "means for supporting the bonding head" in the claimed orientation. This means for supporting is a structural feature of the claimed invention, and not merely a statement of intended use.

The Office Action goes on to state "If the prior art structure is capable of performing the intended use, then it meets the claim." It is respectfully submitted that this

is not a proper grounds for rejection of the claims. As set forth in MPEP §2143.01, "Although a prior art device 'may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion of motivation in the reference to do so.'", citing In re Mills, 916F.2d 680, 682, 16 U.S.P.Q. 2d 1430, 1432 (Fed. Cir. 1990). In the present case, there is no showing of any motivation to modify any of the three references to fix the transducer along a line which divides the X and Y axes. If anything, the references teach away from such a structural arrangement. If one were inclined to fix the position of the bonding head so that it is always oriented along such a line, there would be no reason to incorporate all of the structure that enables the transducer to rotate about the Z axis. Thus, by disclosing such structure, the references are explicitly teaching that it is *undesirable* to keep the transducer oriented in a single, fixed direction.


In any event, to further clarify the distinctions between the present invention and the prior art represented by these references, claim 1 has been amended to recite that the last-claimed element comprises a means for *maintaining* the bonding head in a *stationary orientation*, so that it *remains* fixed along a line dividing the X and Y axes "at all times during relative positioning of the workpiece and the transducer." It is respectfully submitted that the Quick, Elles and Cheng patents do not disclose, nor otherwise suggest, any structure of this type. Even if the position of the transducer remains fixed during a particular bonding operation, the underlying teachings of these references suggest that the transducer is moved at other times, specifically for the purpose of positioning the transducer relative to the workpiece. In contrast, in the claimed invention the orientation of

the transducer relative to the X and Y axes remains fixed at all times, even during the relative positioning of the workpiece and the transducer.

For the foregoing reasons, it is respectfully submitted that the subject matter of the pending claims is neither anticipated, nor otherwise suggested, by any of the applied references. Reconsideration and withdrawal of the rejections are therefore respectfully requested.

Respectfully submitted,

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Attachment to Amendment dated September 18, 2002

Marked-up Claims 1, 4, 5, and 8-11

1. (Thrice Amended) Wedge wire bonding apparatus comprising:
 - (a) means for supporting a workpiece,
 - (b) a bonding head including a transducer having a longitudinal axis,
 - (c) means for causing relative movement of the workpiece and the transducer along [orthogonal X and Y axes simultaneously, and] an X axis,
 - (d) means for causing relative movement of the workpiece and the transducer along a Y axis orthogonal to said X axis, and
 - (e) means for [supporting] maintaining the bonding head in a stationary orientation above the workpiece such that the longitudinal axis of said transducer [is] remains fixed along a line dividing said X and Y axes [to be oriented along said line] at all times during relative positioning of the workpiece and the transducer, for each wire bonding operation.
4. (Amended) Apparatus as claimed in claim 1, wherein said bonding head [supporting means] is fixed relative to said X and Y axes and wherein means are provided for moving said workpiece along said X and Y axes.
5. (Amended) Apparatus as claimed in claim 1, wherein said workpiece supporting means is fixed relative to said X and Y axes and wherein means are provided for moving said bonding head [supporting means] along said X and Y axes.

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Marked-up Claims 1, 4, 5, and 8-11

8. (Amended) Apparatus as claimed in claim 2, wherein said bonding head [supporting means] is fixed relative to said X and Y axes and wherein means are provided for moving said workpiece along said X and Y axes.

9. (Amended) Apparatus as claimed in claim 2 wherein said workpiece supporting means is fixed relative to said X and Y axes and wherein means are provided for moving said bonding head [supporting means] along said X and Y axes.

10. (Amended) Apparatus as claimed in claim 3, wherein said bonding head [supporting means] is fixed relative to said X and Y axes and wherein means are provided for moving said workpiece along said X and Y axes.

11. (Amended) Apparatus as claimed in claim 3 wherein said workpiece supporting means is fixed relative to said X and Y axes and wherein means are provided for moving said bonding head [supporting means] along said X and Y axes.